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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,801

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Graham R Eastham

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EXAMINER

OH, TAYLOR V

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,801	Applicant(s) EASTHAM ET AL.	
	Examiner Taylor Victor Oh	Art Unit 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/27/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/07, 5/05</u> . | 6) <input type="checkbox"/> Other: _____ |

The Status of Claims:

Claims 1-28 are pending.

Claims 1-28 are rejected.

DETAILED ACTION

1. Claims 1-28 are under consideration in this Office Action.

Priority

2. It is noted that this application is a 371 of PCT/GB03/04679(10/31/03), which has a foreign priority document, United Kingdom 0228018.8(11/30/2002).

Drawings

3. None.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 , the phrase “ a bidentate phosphine of general formula (I)” is recited. The expression is vague and indefinite because there is no description of the “ bidentate phosphine of general formula (I)” in the claim. Therefore, an appropriate correction is required.

In claims 1,4 , and 19, the terms “ general ” and “ derivative ” are recited. The expression is vague and indefinite because the specification does not elaborate what is meant by those terms. Therefore, an appropriate correction is required.

In claims 1, 4 ,24-25, the phrases “ chemically treating the said branched (iso) product to produce the corresponding lactate or the acid of formula II ” , “ carrying out a treatment step on the said linear(n) product 1-acetoxy $\text{CH}_2\text{CH}_2\text{C}(\text{O})\text{OR}^{28}$ to produce the 3-hydroxy propanoate ester or acid of formula(III) ” , “ by treatment of the branched (ISO) product ” and “ by treatment of the linear (n) product ” are recited. The expression is vague and indefinite because the skilled artisan in the art is unable to figure out how the said branched (iso) product or the said linear (n) product can be chemically converted into the corresponding product (lactate) or the acid of formula II. Therefore, an appropriate correction is required.

In claim 3 , the chemical term “ Het ” is recited. The expression is vague and indefinite because the skilled artisan in the art is unable to figure out what kind of “ Het ” can be for the R^1 to R^{18} and R^{19} to R^{27} groups. Therefore, an appropriate correction is required.

In claim 3, the phrases “ one or more substituents selected from hydrogen, lower alkyl ----- or $\text{C}(\text{O})\text{SR}^{27}$ or ” and “ selected from hydrogen, lower alkyl ----- or $\text{NR}^{46}\text{R}^{47}\text{R}^{48}$ ” is recited. The expression is vague and indefinite because the Markush type of the phrase “ selected from ” needs the close ended expression “ and ” in the end instead of “ or ”. Therefore, an appropriate correction is required.

In claim 3, the phrase

“

Q¹, Q² and Q³ (when present) each independently represent phosphorous, arsenic or antimony and in the latter two cases references to phosphine or phosphorous above are amended accordingly.

”is recited. The expression is vague and indefinite because the skilled artisan in the art is unable to figure out what is meant by the phrase; particularly, in the case when Q1,Q2, or Q3 is not present. Therefore, an appropriate correction is required.

In claims 3, 9 and 11, the terms “ comprising “, “containing” are recited. The expression is vague and indefinite because these terms would mean that there are some additional components besides a bridging group and a hydroxyl group; the skilled artisan in the art is unable to figure out what else are present in the corresponding compound. Therefore, an appropriate correction is required.

Regarding claim 19 , the phrase "for example" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

In claims 19 and 23 , the phrases “ other suitable polymers or copolymers known to those skilled in the art “, “ also known as” are recited. The expression is vague and indefinite because the skilled artisan in the art is unable to figure out what they represent the corresponding compounds; these terms are improper to use in the claim languages. Therefore, an appropriate correction is required.

Regarding claims 10 and 19, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claims 24-28 provide for the use of the catalyst, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 24-28 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drent et al (EP0495548) in view of Tjaden et al (US 6,307,065).

Drent et al discloses the process for the carbonylation of an olefin in the following (see abstract page):

⊗ The invention relates to a process for the carbonylation of olefins in which process an olefin is reacted with carbon monoxide in the presence of an alcohol or water and of a catalyst system, obtainable by combining:

- (a) a metal of Group VIII or a compound thereof and
- (b) a bidentate phosphine, arsine and/or stibine derivative, wherein as bidentate (b) a compound is selected having the general formula



wherein M^1 and M^2 are independently P, As or Sb, R is a divalent organic bridging group with at least 2 carbon atoms in the bridge, and R^1 - R^4 represent the same or different optionally substituted tertiary alkyl groups. The invention further relates to a catalyst system suitable for this process.

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Table I (Cont.)

Example No	Catalyst components (mmol)	Alkanol, etc. (ml)	Pressure (bar)			Temperature (°C)
			olefin	CO	other	
XII	0.25 palladiumacetate	20 methanol	vinylacetate			75
	0.6 1,3-bis(di-tert. butylphosphino)-propane	40 diglyme	(20 ml)	40		
	0.5 tert.butylsulphonic acid					

(see page 8 ,table I).

Table II (Cont.)

Example No	Reaction rate (mol/gat.h)	Product selectivity (%)	
XII	200	1-acetoxy methyl	
		propionate	40
		2-acetoxy methyl	
		propionate	60

(see page 11, table II)

The amount of catalyst used in the process is not critical. Good results are obtained when the amount of Group VIII metal is in the range of 10^{-2} to 10^{-1} gat per mole of olefinic double bond to be carbonylated. Preferably this amount is in the range of 10^{-3} to $5 \cdot 10^{-2}$ gat per mole.

(see page 3 ,lines 29-31).

The carbon monoxide required for the reaction may be supplied in substantially pure form, or contaminated with in general minor amounts of inert compounds such as nitrogen, hydrogen and the like. The presence of sulphur containing contaminants such as COS or some metal compounds e.g. metal carbonyl compounds, should be avoided.

Hydrogen or a hydrogen containing gas may be present as a diluent for the carbon monoxide and other gaseous reactants. The pressure at which the hydrogen is supplied may vary, but is usually not more than that of the CO partial pressure.

(see page 4 ,lines 11-18).

The instant invention, however, differs from the prior art in that the part of the bidentate is an aryl compound and the products of the reaction are separated by distillation.

Tjaden et al discloses the process of producing epsilon caprolactones and /or esters thereof in the followings (see from col. 1, line 52 to col. 2 ,line 3):

This invention also relates to processes for producing one or more substituted or unsubstituted epsilon caprolactones, e.g., epsilon caprolactone, and/or hydrates and/or esters thereof which comprise: (a) subjecting one or more substituted or unsubstituted alkadienes, e.g., butadiene, to hydrocarbonylation in the presence of a hydrocarbonylation catalyst, e.g., a metal-organophosphorus ligand complex catalyst, to produce one or more substituted or unsubstituted penten-1-ols; and (b) subjecting said one or more substituted or unsubstituted penten-1-ols to carbonylation in the presence of a carbonylation catalyst, e.g., a metal-organophosphorus ligand complex catalyst, to produce said one or more substituted or unsubstituted epsilon caprolactones and/or hydrates and/or esters thereof. The hydrocarbonylation reaction conditions in step (a) and the carbonylation reaction conditions in step (b) may be the same or
] different. The hydrocarbonylation catalyst in step (a) and the carbonylation catalyst in step (b) may be the same or different.

Furthermore, other olefinic starting materials include 1,3-dienes, vinyl acetate, 3-butenyl acetate, vinyl propionate (see col. 18, lines 52-67).

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Examples of suitable bidentate phosphine ligands according to the invention are 1,1'-bis (diphenylphosphino)

ferrocene; 1,1'-bis(diisopropylphosphino)ferrocene; 1,1'-bis(diisobutylphosphino)ferrocene; 1,1'-bis(dipropylphosphino)ferrocene; 1,1'-bis(dicyclohexylphosphino)ferrocene; 1,1'-bis(isopropylcyclohexylphosphino)ferrocene; 1,1'-bis(ditertbutylphosphino)ferrocene; 1-(diisopropylphosphino)1'-(phenylisopropylphosphino)ferrocene; 1,1'-bis(di-2-thiophenylphosphino)ferrocene; 1-(diisopropylphosphino)-1'-(diphenylphosphino)ferrocene; 1,1'-bis(isopropylphenylphosphino)ferrocene; and 1,1'-bis(di-2-thiophenylphosphino)ferrocene.

(see from col. 24 ,line 66 to col. 25, line 10).

EXAMPLE 32

A 100 milliliter overhead stirred high pressure reactor was charged with 0.28 mmol palladium(II) acetate, 0.55 mmol of bis(2,2'-diphenylphosphinomethyl)biphenyl, 2.7 mmol methane sulfonic acid, 2 milliliters of water, 1.5 milliliters of 3-pentenol, 24 milliliters of 1,4-dioxane, and 1 milliliter of diglyme as internal standard. The reactor was pressurized with 10 psi carbon monoxide, heated to 130° C., and then pressurized to 1500 psi carbon monoxide. Samples of the reaction mixture were taken at time zero and after 2 hours, and then analyzed by gas chromatography. At the end of the reaction (2 hours), the gases were vented and the reaction mixture drained. Details of the reaction are set out in Table E.

(see col. 36, lines 12-25).

Recovery and purification of unsaturated alcohols may be by any appropriate means, and may include distillation, phase separation, extraction, precipitation, absorption, crystallization, membrane separation, derivative formation and other suitable means. For example, a crude reaction product can be subjected to a distillation-separation at atmospheric or reduced pressure through a packed distillation column. Reactive distillation may be useful in conducting the hydrocarbonylation reaction.

(see col. 20 ,lines 52-60).

Drent et al discloses expressly the process for the carbonylation of the vinyl acetate in the presence of the alcohol and the catalyst system containing palladium and the bidentate; similarly, Tjaden et al does disclose the process for the carbonylation of the vinyl acetate in the presence of the alcohol and the catalyst system containing the palladium and the bi(2,2'-diphenylphosphinomethyl)biphenyl bidentate (see col. 36, lines 12-25). Furthermore, the reactive distillation may be useful in conducting the hydrocarbonylation reaction. Therefore, it would have been obvious to the skilled artisan in the art to be motivated to use Tjaden's et al bi(2,2'-diphenylphosphinomethyl)biphenyl as an alternative in the Drent et al process. This is because both processes are commonly involved in the carbonylation process using the same palladium metal and the similar bidentates; the skilled artisan in the art would expect such a manipulation to be successful and feasible as guidance shown in the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres can be reached on 571-272-0867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Taylor Victor Oh, MSD,LAC
Primary Examiner
Art Unit :1625

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4/3/08